This 6-part bibliography lists those sources of possible interest to readers or researchers that appeared as of December 1971. In part I the terminology is clarified, and a view of the open education philosophy and a short historical overview of open space school design are provided. Parts II, III, and IV contain listings of publications originating respectively from the United States, England, and Canada. Part V contains a list of related bibliographies and publication lists. Part VI provides a directory of publishers and distributors. The individual bibliographical items in parts II, III, and IV are categorized according to type of publication -- i.e., books and pamphlets, periodical literature, films, etc. Each type of publication is subsequently subgrouped according to topic. (Author/MLF)
A COMPREHENSIVE BIBLIOGRAPHY OF OPEN EDUCATION
and OPEN SPACE SCHOOLS — A READER'S GUIDE

by

Frank H. Moyer

1972
To my wife, Janice

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A Bibliography of Open Education by Roland S. Barth and Charles H. Rathbone. Published jointly by Advisory for Open Education: Cambridge, Massachusetts and Education Development Center: Newton, Massachusetts, 1971.


Plainfield, New Jersey
American educators have been talking a long time about such things as educating for life, basing instructional activities on the interests, abilities, needs, and problems of the learner, emphasizing learning rather than teaching, integrating subject matter into fundamentally more meaningful and relevant interdisciplinary learning packages, emphasizing process rather than product, developing responsibilities and independence in children, developing and nurturing positive self-images in children and more positive attitudes toward learning, developing creativity, and encouraging innovation at all operational levels. All these ideas have become standard phrases of the profession; however, aside from a few forward-looking schools scattered across the country, very little sincere application of the philosophy and learning theory underlying these concepts has taken place.

In England, however, these phrases are much more than professional jargon. In perhaps twenty-five to forty percent of the English primary schools, many of these concepts have been implemented. These English primary schools are committed to the basic notion that children should live more richly now, rather than at some ill-defined time in the distant future. Elementary education in England, then, is not preparation for life; education is life - with all of life's excitement, challenge, and potential for growth. The curriculum of these schools emerges through the mutual interests and explorations of children and their teachers working together in an open and uninhibited flexible environment.

In the United States and Canada during the past few years there has been a growing awareness of the dichotomy between what educators were saying in terms of what should be done and what they were actually doing. In addition, a growing body of knowledge continues to point to the inadequacies and often times the inhumanities and ineffectiveness of the practices associated with the traditional self-contained elementary classroom. The typical elementary teacher simply cannot effectively plan for seven, eight, or even nine different subjects tradi-
tionally taught in the self-contained classroom while trying to stimulate students' interests and attempting to cope with their idiosyncratic styles of learning. In effect, some educators are indicating that the self-contained classroom places serious limitations on the amount of learning which can take place within each "container;" and consequently, significantly reduces the effectiveness of the school as an institution.

It is significant to point out that a growing number of deeply concerned and "turned on" educational critics are focusing nationwide attention on our educational system and the effects it is or is not having on our young children. There are a number of books available which are stinging criticisms of the ineffectiveness and the "inhumanity" of our schools. Included here are: John Holt's *How Children Learn* and *How Children Fail;* Jonathan Kozol's *Death at an Early Age;* Nat Hentoff's *Our Children are Dying;* Paul Goodman's *Compulsory Mis-Education;* James Herndon's *The Way It Supposed to Be;* and, of course, Charles Silberman's widely acclaimed book, *Crisis in the Classroom.* These publications and others which are somewhat less subjective point to various inadequacies, the inhumanities, unresponsiveness, and the oftentimes ineffectiveness of the traditional self-contained classroom. The need for an openness to change and a rational planned approach to change and the implementation of innovations are becoming more and more apparent.

A suggested alternative to the traditional philosophy underlying the self-contained classroom is the concept of Open Education which has evolved and been accepted in many primary or infant schools in England. This new educational approach, subsequently, has been imported into this country by its early proponents including: Lillian Weber of New York City and Lore Rasmussen of Philadelphia. Many of these forward-looking and innovative Open-Classroom schools are modeled after the British Infant School, the Leicestershire Model; nevertheless, American modifications have and will continue to appear. For the most part these schools are experimental in nature; and their success, in fact, the success of Open Education in general remains to be realized or measured.

The primary purpose of this bibliography is to provide the interested reader or researcher with as comprehensive as possible a listing of publications and materials concerning Open Education (the Open Classroom in this country and the British Infant Primary School, Leicestershire Model in England) and Open-Space school design as of December, 1971.

A distinction will be drawn, which is not always apparent
in the current literature, between the philosophy of Open Edu-
cation as manifest by the Open Classroom and the new concepts
of school architecture and design which promote total environ-
mental flexibility within the school facility by eliminating
interior walls and thereby creating "Open-Space" learning
areas in place of traditional "box-like" classrooms. Essent-
tially an Open-Space or Open-Plan School is a school which is
architecturally, structurally, and/or physically open in the
sense that there are few if any permanent physical interior
barriers to the optimal utilization of the instructional areas
within the facility. An Open-Space school may or may not be
operating under a philosophy which approaches Open Education.
Open-Space and Open Education can complement and enhance the
educational effects of the other to the ultimate benefit of
the learner. Nevertheless, one is not a prerequisite of the
other.

The interested researcher, teacher, administrator, stu-
dent, or parent will find publications listed in this compila-
tion which deal with: the need for change in elementary educa-
tion; the theoretical and philosophical basis of Open Education;
the implications of Open Education and Open-Space school design
for teacher training and/or re-training; strategies for the
implementation of Open Education; the British Primary School,
the British Infant School, and the Leicestershire Model; descrip-
tions of American models of Open Classrooms; the architectural
and educational consequences of Open-Space school design; the
implications for curriculum change; the changing role of
teachers, administrators, and students in Open-Space schools
and Open Classrooms; and research concerning learning in Open-
Space schools and Open Classrooms.

The bibliography is organized into six parts. Part I
provides the reader with a clarification of terminology, a view
of the philosophy of Open Education, and a short historical
overview of Open-Space school design. Parts II, III, and IV
contain bibliographical listings of publications concerning
Open Education and Open-Space originating respectively from
the United States, England, and Canada. Part V contains a list
of related bibliographies and publication lists; while Part VI
provides a directory of publishers and distributors.

The individual bibliographical items within Parts II, III,
and IV are categorized according to type of publication - books
and pamphlets, periodical literature, films, etc. Each type
of publication is subsequently subgrouped according to topic.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A COMPREHENSIVE BIBLIOGRAPHY OF OPEN EDUCATION</td>
<td>i</td>
</tr>
<tr>
<td>and OPEN SPACE SCHOOLS -- A READER'S GUIDE</td>
<td></td>
</tr>
<tr>
<td>Preface</td>
<td>1.0</td>
</tr>
<tr>
<td>INTRODUCTION <em>(White)</em></td>
<td></td>
</tr>
<tr>
<td>The Used and The Confused-A Clarification of Terminology</td>
<td></td>
</tr>
<tr>
<td>Understanding the Philosophical Foundations of Open Education</td>
<td></td>
</tr>
<tr>
<td>The Historical Development of Open-Space School Design</td>
<td></td>
</tr>
<tr>
<td>DOMESTIC PUBLICATIONS <em>(Blue)</em></td>
<td>2.0</td>
</tr>
<tr>
<td>Books and Pamphlets*</td>
<td></td>
</tr>
<tr>
<td>Dissertations</td>
<td></td>
</tr>
<tr>
<td>Films and Filmstrips</td>
<td></td>
</tr>
<tr>
<td>Periodicals*</td>
<td></td>
</tr>
<tr>
<td>Unpublished Materials</td>
<td></td>
</tr>
<tr>
<td>BRITISH PUBLICATIONS <em>(Gold)</em></td>
<td>3.0</td>
</tr>
<tr>
<td>Books and Pamphlets*</td>
<td></td>
</tr>
<tr>
<td>Periodicals*</td>
<td></td>
</tr>
<tr>
<td>CANADIAN PUBLICATIONS <em>(Green)</em></td>
<td>4.0</td>
</tr>
<tr>
<td>Books and Pamphlets*</td>
<td></td>
</tr>
<tr>
<td>Periodicals*</td>
<td></td>
</tr>
<tr>
<td>Unpublished Materials</td>
<td></td>
</tr>
<tr>
<td>BIBLIOGRAPHIES <em>(Yellow)</em></td>
<td>5.0</td>
</tr>
<tr>
<td>PUBLISHERS and DISTRIBUTORS <em>(Pink)</em></td>
<td>6.0</td>
</tr>
<tr>
<td>INDEX <em>(White)</em></td>
<td>7.0</td>
</tr>
</tbody>
</table>

*The publications listed within these sections are subclassified according to major emphasis. Sub-section titles include: BRITISH INFANT SCHOOL, LIECESTERSHIRE MODEL, OPEN EDUCATION, OPEN CLASSROOM, OPEN-SPACE SCHOOLS, RESEARCH, PIAGET, PLOWDEN, RELATED LITERATURE, etc. Refer to INDEX for a complete list of sub-section titles.
PART I

INTRODUCTION
INTRODUCTION

Open Education...Open Classroom...Open-Space....

The Used and The Confused—A Clarification of Terminology

Open Education: What is it? When one begins to search the literature for a definition of this phrase, you are immediately confronted by a plethora of terms which are used interchangeably and which are seemingly synonymous with "Open Education." The terms which are used basically as synonyms with Open Education include: free school, integrated curriculum, Open-Plan School, open-concept school, Open-Space school, British primary school, (Guenther, 1971) Open School, Open Classroom, informal education, integrated day, free day, British Infant School, the Leicestershire Plan or Model, (Staples, 1971) informal classroom, (Barth, 1971) and the developmental classroom. (Barth and Rathbone, 1969)

The need for clarification of terminology is evident.

Open Education is the generic term. According to Nation's Schools "Open Education" refers to:

...an approach to elementary school teaching which has spread widely throughout the British infant schools—enrolling children aged 5-7—since World War II and which has been cropping up in a variety of American classrooms over the past four or five years. (It is) Based on an impressive body of research and theory on how children do and do not learn, the approach discards the usual elementary classroom set-up and the traditional roles of teachers and students for a freer, more informal, and highly individualized learning experience. (May, 1971)
Barth and Rathbone characterize the Open Education approach as one which is:

...spatial openness...doors are ajar and children are free to come and go, bringing objects of interest in and taking objects of interest out...each room is open, subject to change with changing needs...

Time is open...to permit and release and serve children rather than to constrain and prescribe and master. The curriculum is open to significant choice by adults and by children as a function of the needs and interest of each child at each moment...most fundamental...an openness of self. Persons are openly sensitive to and supportive of other persons, not closed-off by anxiety, threat, custom, and roles. Feelings are exposed, acknowledged, and respected, not withheld in fear and defensive-ness. (1969)

According to Nyquist (1971) Open Education is based on the concept of childhood as something to be cherished - a vital part of life itself to be lived richly each day. The traditional stylized roles of teachers and pupils are discarded for more freer, informal roles and child-centered learning experiences. Resnik (1971) points out that at times the educational philosophies of Open Education and more traditional approaches contradict each other while at others Open Education can be the antithesis of traditional elementary education.

Spodek in pointing out the difficulty of defining Open Education because it seemingly doesn't adhere strictly to any one dogma and it isn't characterized by any one organizational model states that it can be best understood in terms
of the assumptions underlying it and the mode of decision making utilized in it. Spodek lists five basic assumptions, including:

1. Learning takes place as a result of an individual's encounter with his environment;
2. Learning is not linear; a single educational goal can be achieved using many avenues;
3. Expression is a source of learning;
4. Feelings have a legitimate place in the classroom; and
5. Children are viewed as competent, desirous of learning, and trustworthy. (Spodek, 1971)

He continues by stating that educational decisions in the learning process are a result of continuous interaction between the teacher and the student. (Spodek, 1971)

The terms which are essentially synonymous with Open Education and which are derived from it include: British Primary School, British Infant School, the Leicestershire Plan, Open Classroom, informal education, informal classroom, and developmental classroom. The latter terms seem to be American derivations.

Flurry indicates that Open Education is more than an "Open-Plan School" because the latter refers only to a type of physical environment, however "...it is characterized by a recognition of the need to make maximum and imaginative use of all available space." (Flurry and Anderson, 1971)

Open-Space, Open School, and Open-Plan School refer to a physical space not an educational approach, while the Open
Classroom refers to an educational program based on the philosophy of Open Education which is operating in a conventional self-contained classroom space and using the traditional staffing arrangement. This doesn't however preclude the implementation of an Open Classroom approach in an Open-Space facility.

Those terms which have a different meaning are: free day, integrated curriculum, informal day, integrated day, and free school.

The latter terms are essentially synonyms of the integrated curriculum concept with the exception of the term free school. Integrated curriculum essentially means there are no artificial subject slices, and pupils are consequently allowed to experience the relationship between the various discipline areas. (Guenther, 1971) Subjects are not taught in isolation but rather an interdisciplinary curriculum organization is emphasized. Integrated day is described in the words Heraclitus. "Everything flows, nothing is fixed." (Gallina, 1970) In another author's words, integrated day becomes..."most subjects are taught and learned simultaneously, rather than in the typical manner..." (Beersson, 1971) The integrated curriculum is essentially an activity-centered curriculum designed around the guided interests of the child. It allows for informal interaction between students and students and students and teachers. It is essentially an activity/experience oriented approach to teaching and learning.
Free schools, (Smith, 1971) on the other hand, are essentially alternatives to the public school system which have been established within various communities by individuals or groups who have perceived intolerable inequality or inhumanity in the public school system. A certain amount of confusion centers about this term because many of these schools do use an Open Classroom approach to learning.

Another term which is commonly associated with the Open Education is family grouping. This is essentially a vertical grouping arrangement used in the British Infant and/or Primary Schools of England. Each group of children consists of children of more than one age group...i.e. multi-age grouping. Each class may contain a cross-section of the entire school population - all ages are mixed together. (Featherstone, 1971) A number of variations of this have evolved, but they follow the basic pattern. Moorehouse (1970) defines family grouping as "...children of two, three, or more age groups...deliberately organized into parallel classes."

Returning to our original question - What is Open Education? - we find that it is an approach to teaching, a restructuring of the curriculum, and a restructuring of the teacher-learning environment. One could also say that it is another way with which to view childhood. Open Education is based on a growing body of research and theory on how children learn, especially the work of Swiss psychologist Jean Piaget. The conventional elementary classroom setting
and the traditional roles of teacher and student are discarded for a more informal and highly individualized learning experience. Classroom spaces become decentralized and the regimented rows of desks in the typical classroom are replaced by a diffusion of tables, chairs and learning materials. Classrooms become learning areas or interest centers. Children are free a great deal of the time to move from area to area, to choose their own activities, and to engage in meaningful personal interaction with teachers and peers. Heavy stress is placed on creating an environment which is "super-saturated" with learning resources of all types. (Cook and Mack, 1969) The approach encourages children to learn from concrete experience based on their interests and from one another. The approach is one which creates an environment which encourages children to learn the way children really do learn best - through relevant activity oriented concrete experiences.

**Understanding the Philosophical Foundations of Open Education**

In the Open School (Open Classroom), according to Eberle, (1969) the word "space" has come into use as a substitute for the more traditional term "classroom." Space is a place for teachers and students, and/or students and students to interact. It is also the prime staging area for the interface of pupils with action-oriented individualized learning experiences.

Using this concept of "space" as a benchmark, it becomes
possible to formulate a philosophical foundation upon which an educational program can be constructed.

According to Staples, (1971) "Of the two elements comprising the term 'open space,' 'open' is the more basic and significant concept." He points out that to be meaningful and to have integrity, "openness" must be characterised by approachability, ease of interpersonal communication, mutual supportiveness between student and teacher, informal control, and a stimulating learning environment.

The philosophical foundation of the Open-School places significant emphasis on two basic principles - individuality and flexibility. We must accept that these two principles mutually serve the purposes of the learner, the community, and the larger society.

In discussing individuality, a parallel may be drawn between the "open" and "closed" societies and "open" and "closed" classrooms. According to Pantini, (1962) a "closed" society is a totalitarian social order where the individual is subservient to the state, whereas the "open" (democratic) society is one in which the individual is valued over the state. According to Pantini's views, classrooms are but miniature societies reflecting the larger societies from which they have emerged.

In the closed classroom the teacher is the center of attraction. This is essentially a "teachercentric" organization. The learners take their cues from the teacher.
teacher-ascribed standards result in conforming behavior; the teacher is the source of truth; the climate fosters convergent values and, consequently, convergent modes of thought and attitudes are developed and rewarded; acquired knowledge is valued, and the student's role is primarily a passive one of acquiring knowledge.

The Open Classroom, on the other hand, is a replica of an open society; one which is designed to develop those values needed to support and encourage an open society. These values are first, freedom and secondly, self-direction. Open Classrooms are "pupilcentric" and the development of creative self-expression is a primary aim. The climate of an Open Classroom fosters the development of inner-directed individuals and creativity. Critical thinking is fostered since a primary process in this type of climate is inductive rather than deductive. This open environment is oriented toward an active learning role on the part of the student, is exploration-committed; and process is valued as much as product. (Baughman and Eberle, 1965) Emphasis is on learning rather than teaching and on process rather than product.

Thus, the Open Classroom is pupil centered and action oriented - learning is an active process. Consequently, individualized instruction, providing multiple learning routes, a variety of teaching strategies, a great variety of learning materials, and teacher/pupil interactive planning,
would be fundamental organisational tenets. According to Eberle:

The program is exploratory. The cultivation of the intellectual processes of imagination, exploration, judgment, and education are integrated into the learning scheme. Pupil self-expression, creative production, and inventiveness are recognized and rewarded. (Eberle, 1969)

The second basic principle, flexibility, involves both our institutions - the schools, and people as individuals. The schools cannot ignore the changes which are taking place either outside in the larger society or inside in educational technology. Complete flexibility and adaptability may be impossible to achieve. Nevertheless, it is quite possible to build institutions which give us a substantial measure of flexibility with which to meet today's needs and attempt to foresee and meet those of tomorrow. For instance, the Open-Spade school offers a school plant which is essentially fluid and highly adaptable to the foreseeable and unforeseeable changes in educational technology. This type of learning environment is amendable to numerous instructional strategies, contemporary modes of learning, and flexible enough to support changing objectives and programs.

In addition to cognitive, affective and psychomotor outcomes, Open educators are attempting to develop in people not only attitudes of self-responsibility and inner-directedness but also positive attitudes toward self and learning.
Essentially these people would be able to accept and adapt to changes in society and changes in their own roles within the larger society.

The Vermont State Department of Education express the philosophy of their public schools in seventeen fundamental concepts about children and learning. These concepts essentially reflect much of what is being said by the proponents of Open Education. These concepts are:

1. The emphasis must be placed upon learning, rather than teaching;
2. A student must be accepted as a person;
3. Education should be based upon the individual's strong, inherent desire to learn and to make sense of his environment;
4. All people need success to prosper;
5. Education should strive to maintain the individuality and originality of the learner;
6. Emphasis should be upon a child's own way of learning - through discovery and exploration - through real rather than abstract experiences;
7. The development of an individual's thought process should be primary;
8. People should perceive the learning process as related to their own sense of reality;
9. An individual must be allowed to work according to his own abilities;
10. The teacher role must be that of a partner and guide in the learning process;
11. The development of a personal philosophy, a basic set of values, is perhaps one of the most important of human achievements;
12. We must seek to individualize our expectations of a person's progress as we strive to individualize the learning experience for each person;
13. The environment in which students are encouraged to learn must be greatly expanded;
14. The school should provide a structure in which students can learn from each other;
15. To provide a maximum learning experience for all students requires the involvement and support of the entire community;
16. Schools should be compatible with reality. Learning which is compartmentalized into artificial subject fields by teachers and administrators is contrary to what is known about the learning process; and

17. Individuals should be encouraged to develop a sense of responsibility. (1971)

Barth (1970) points out that even though some attempts at introducing Open Classroom approaches have not met with success, there has developed an underlying rationale—a set of basic assumptions about how children learn, the conditions for learning, and the nature of knowledge itself which contain at least the embryo of a theory. Barth is the first to point out that some of these assumptions are not necessarily valid—some are supported in the research and literature while others are not. (The works of Piaget, Erickson, Freud, Froebel, Pestalozzi, Tolman, Dewey, Montessori, Rousseau, Kilpatrick, and Isaacs have contributed to the rationale of Open Education). These assumptions seem to underlie the Open Education movement:

1. Children are innately curious and display exploratory behavior quite independent of adult intervention;

2. Exploratory behavior is self-perpetuating;

3. The child will display natural exploratory behavior if he is not threatened;

4. Confidence in self is highly related to capacity for learning and for making important choices affecting one's learning;

5. Active exploration in a rich environment, offering a wide array of manipulative materials, will facilitate children's learning;
6. Play is not distinguished from work as the predominant mode of learning in early childhood.

7. Children have both the competence and the right to make significant decisions concerning their own learning.

8. Children will be likely to learn if they are given considerable choice in the selection of the materials they wish to work with and in the choice of questions they wish to pursue with respect to these materials.

9. Given the opportunity, children will choose to engage in activities which will be of high interest to them.

10. If a child is fully involved in and is having fun with an activity, learning is taking place.

11. When two or more children are interested in exploring the same problem or the same materials, they will often choose to collaborate in some way.

12. When a child learns something which is important to him, he will wish to share it with others.

13. Concept formation proceeds very slowly.

14. Children learn and develop intellectually not only at their own rate but in their own style.

15. Children pass through similar stages of intellectual development, each in his own way and at his own rate and in his own time.

16. Intellectual growth and development take place through sequence of concrete experiences followed by abstractions.

17. Verbal abstraction should follow direct experience with objects and ideas, not precede them or substitute for them.

18. The preferred source of verification for a child's solution to a problem comes through the materials he is working with.
19. Errors are necessarily a part of the learning process; they are to be expected and even desired, for they contain information essential for further learning.

20. Those qualities of a person's learning which can be carefully measured are not necessarily the most important.

21. Objective measures of performance may have a negative effect upon learning.

22. Learning is best assessed intuitively, by direct observation.

23. The best way of evaluating the effect of the school experience on the child is to observe him over a long period of time.

24. The best measure of a child's work is his work.

25. The quality of being is more important than the quality of knowing; knowledge is a means of education, not its end. The final test of an education is what a man is, not what he knows.

26. Knowledge is a function of one's personal integration of experience and therefore does not fall into neatly separate categories of "disciplines."

27. The structure of knowledge is personal and idiosyncratic; it is a function of the synthesis of each individual's experience with the world.

28. Little or no knowledge exists which it is essential for everyone to acquire.

29. It is possible, even likely, that an individual may learn and possess knowledge of a phenomenon and yet be unable to display it publicly. Knowledge resides with the knower, not in its public expression. (Barth, 1970)

Although many of these assumptions above are in direct contradiction to many of the concepts which underlie the more conventional approach to education, they must be viewed...
in light of the way one believes knowledge is transmitted to the learner.

The traditional learning model sees knowledge as a pre-established set of skills, facts and experiences which all must learn. This established body of knowledge is transmitted directly to the learner by the teacher through the use of a teacher-directed activity such as lecturing. Barth (1970) indicates that Belanger's model may be a more appropriate one for understanding the way knowledge is transmitted to the learner according to the proponents of Open Education.

According to Belanger's model, knowledge is unique to each individual and is best learned from direct personal exploration of his environment. Learning takes place when the learner interacts with the real world. Learning is essentially idiosyncratic. The teacher is somewhere outside of the learning process and makes every attempt to make sure the child plays an active role in his exploration of the real world. The teacher is not a transmitter but a guide to and facilitator of learning. (Barth, 1970)

Moorehouse (1970) indicates that there are two fundamental principles which underlie the kind of relationship between a teacher and student that is necessary in an Open Classroom environment and which are necessary to change the focus of education from teaching to learning. First, a real appreciation and deep understanding of the uniqueness of
each child is basic. Secondly, educators must accept and have confidence in the idea that children learn from experience, from exploration, and from active participation in discovery.

About three decades ago John Dewey synthesized the ideas of Pestalozzi and Froebel with his own empirical concept that children would learn best if they were encouraged to become involved in their own education. Dewey's permissive pragmatism became the unofficial philosophy of the American educational establishment. His approach became known as "progressivism," and education reform swept through thousands of American classrooms. However, Featherstone comments in his recent book, *Schools Where Children Learn*:

> What wisps of the vision of education as individual growth trailed into the public schools were largely rhetorical. There was no basic change in methods of teaching or classroom organization. (1971)

Barth (1970) states that the child-centered orientation of Open Education is reminiscent of Dewey's progressive philosophy, but that is not a neo-progressive movement, even though Dewey proposed that children learn by doing through the use of activity methods.

Philosophically, there may be a resemblance between certain aspects of progressive education and Open Education. This resemblance may be the fundamentally humane concern for
the individual and the idea that the student should play an active role in learning.

Finally, there are fundamental differences between the way traditional educators view the nature of children and childhood when compared to the views held by the proponents of Open Education. Many American educators view childhood as something to be dismissed as soon as possible and that the child is essentially untrustworthy and therefore must be guided and urged in the right path. Children have an uncanny way of perceiving how they are perceived by adults. They then perform as they are expected to perform. They are not expected to be good, so they are often not good. However, in the Open Classroom children are encouraged to be children, to discover, and to explore. They are allowed to grow up and learn at their own rate in an environment that is free, supportive, and nonthreatening. (Nyquist, 1971)

The Open Classroom focuses on the child, his background, his attitudes toward himself and toward learning, and his environment. Open educators through showing trust in children work toward developing self-responsibility, positive self-concepts, positive feelings toward others and positive attitudes toward learning. A basic assumption is that a child's happy productive adulthood stems from a satisfying, reasonable childhood. Education is not preparation for life, "... education is life." (Rogers, 1969)
The Historical Development of Open-Space School Design

Historically, the development of public school facilities in this country has gone through a number of distinct stages. Beginning with one-room schoolhouses containing meager and simple handmade furnishings and a curriculum which was based on strict colonial religious beliefs, school architecture has progressed in intermittent leaps and bounds throughout our history. More educationally significant progress has been made during the last decade than in the previous fifteen decades. Today's new educational facilities can provide extremes in space utilization flexibility as well as nearly total control of the learning environment - all to the benefit of the learner.

Our educational institutions are tradition bound. Changes which have occurred have been evolutionary rather than revolutionary. Our schools have been and continue to be reluctant to meet the challenge of change. Significantly, the economic and political realities of public school finance have determined to a great extent the ability of school systems to meet the challenge of change. School buildings representing substantial tax dollar investment built twenty years ago cannot be abandoned today simply because they are inappropriately designed to meet the needs of today's learners. It is also
all too true that the design of a school building determines to a great extent the kinds of learning experiences which can be provided to the learner inside its walls. Needed curricular changes have been and will continue to be hindered if not completely blocked by inflexibly designed school buildings.

Recently, there has been increasing pressure upon the schools not only to practice what they have been preaching - to meet the needs of individual learners - while at the same time there has been a tremendous increase in pressure on the available tax dollar from other segments of the society. Education can relieve some of this pressure on the tax dollar by placing greater emphasis on designing school facilities which meet the criterion of flexibility, expansibility, and convertibility.

Flexibility is the key to meeting not only today's needs but also the needs of the future. However, the word flexibility is an abstraction that according to architect William Caudill encompasses more specific terms including: expansible space, that can allow for ordered growth; convertible space, that can be economically adapted to future needs; versatile space, that serves many functions; and malleable space, that can be changed, "...at once and at will." (EFL, 1968) Schools built today must be designed to be able to meet new demands and perform new functions in the future.
According to Homer M. Johnson, Head of the Department of Educational Administration at Utah State University:

...schools must not be monuments to tradition but must presently enhance all that we currently know about providing the maximum options for students and provide spaces that can be effectively and efficiently outlined to accommodate the future. (1967)

**Colonial Schools**

Our colonial forebears had a strong religious tradition. Their early efforts at providing public education were meager and austere. The earliest schools were simple and crudely constructed one-room rough timber buildings. If no schoolhouse was available, classes were conducted in the schoolmaster's home or in a rented vacant building. The elementary curriculum was devoted to providing the masses with the ability to read the Bible, while higher education provided preparation for young men for religious endeavors.

The typical school had low ceilings, poor lighting, uneven heating, bad ventilation, and outside sanitary facilities. Only the crudest of equipment was available and usually pupils sat on benches. These one-room buildings were designed as ungraded schools into which children of all ages were gathered.

The first school constructed with public tax money was a one-room structure which contained 180 square feet of space.
The single room was fifteen feet by eighteen feet and was built on land which was considered useless for any other purpose. The interior was crudely furnished. A bench and writing shelf which ran the length of each wall and the teacher's lectern were the only furnishings. Heat was provided by a fireplace and later a pot-bellied stove. A few small windows, candles, or oil lamps provided the only light. (Johnson, 1971)

During the early nineteenth century, people clung to their European traditions. The schools changed very slowly. One-room schools containing around 900 square feet in floor space were designed to house approximately 100 students of all ages and capabilities. This provided about nine square feet of space for each child. (Martin, 1902) All desks and chairs were usually one size and were securely fastened to the floor. Students usually wrote on a piece of wood or slate with chalk or charcoal. The interiors of these schools were usually unpainted bare clapboards and must have been terribly uncomfortable for the learner.

Schoolhouses, 1847-1945

During the early part of the nineteenth century, while expanding its agrarian foundations, the United States moved westward, exploded into the industrial age, and crept toward civil war, Horace Mann, Henry Barnard, and others expanded on Franklin's earlier notion concerning a practical education
for the masses by presenting a case for the need for a tax supported public school system. This system, free to all, was based upon the principle that education is necessary for the protection of the state rather than a privilege granted to the individual. The “common” school was born. It remains as a unique contribution of our American heritage.

European traditions continued to dominate the American school systems. A significant change occurred with the introduction of the Lancastrian monitorial system of instruction based upon Pestalozzian principles. Within this system one teacher instructed fifty monitors who in turn would instruct ten other students. The facility for this type of school consisted of a large hall which could house as many as 500 children. (EFL, 1960) During 1822 New York City provided lessons to 500 students in a room 50 feet by 100 feet - only ten square feet per child. The room was furnished with rows of benches and provided space around the walls for each monitor to meet with ten students. By 1840 most Lancastrian schools had disappeared. (EFL, 1960)

A second significant development during the early nineteenth century was the beginnings of high schools as distinct from grammar schools. The English Classical School, the first high school was started in Boston during 1821. The name was later changed to the English High School. In 1827 Massachusetts passed a law requiring high schools to
be built in towns. In 1874 the decision of the Kalamazoo case provided for the use of public tax monies for high school instruction.

The introduction of high schools and increasing population within industrialised urban centers provided a need for changes in elementary education. A graded approach was adopted. In 1847 the Quincy Grammar School was built in Boston. This school exemplified a new architectural approach to school design. The children were sorted into grades and then into classes of about 55 students and one teacher. Each of these classes met in a room 31 feet by 26 feet for one year. The pupil was expected to sit passively as the teacher lectured and wrote lessons and drill work on blackboards which covered three of the four walls. (EFL, 1960)

The Quincy school consisted of three floors with four identical classrooms on each floor. A fourth floor contained an assembly hall "...for devotional services and other general exercise." (EFL, 1960) During the next 100 years few school architects and administrators dared to deviate from the basic prototype provided by the Quincy School.

The exteriors of school buildings built after 1850 became "imposing edifices" which were said to express public spirit, community taste, and refinement. (Ledbetter, 1969) The interior box-shaped classroom became increasingly resistant to change. These schools established the standard for classrooms for decades to come.
Changes in curriculum occurred. Slowly, the religious orientation of the public school began to fade in favor of more scientific and practical learning experiences. The classical subjects began to give way to reading, writing, arithmetic, art, music, history, and geography. Between 1890 and 1920 there was a reaction to the regimentation in the schools; and also the birth rate declined. Consequently, it became possible to reduce class size from 35 to 40, 35, or 30 students. (EFL, 1960) School buildings built after 1890 still reflected an emphasis on appearance of the exterior rather than of the function of the interior. Classrooms generally contained 750 square feet of space, allowing approximately 15 square feet per pupil. Theisen (1966) indicates that floor space, air volume per occupant, class size, window area, and lighting didn't become important matters for consideration by school planners until after 1900.

During the 1920's classes of 25 to 30 pupils instead of 35 to 40 became the standard and the recommended area of each classroom was commonly 900 to 1000 square feet. (Theisen, 1966) After physical education and manual, industrial, and vocational training courses were added, it became increasingly apparent that some subjects, especially the physical education and vocational subjects, required rooms with special facilities. Consequently, high schools began to appear which were not designed like elementary schools.
even though the basic room size and shape had not changed.

According to McClurkin:

The low ebb in school plant planning in this century probably was reached in the later years of the Great Depression, when Works Progress Administration worked directly in local school districts to construct buildings with work-relief crews. An 'plans' worked up by WPA officers with no consultation with state or local specialists, and with a minimum of local financial support. (1964)

This exemplifies the lack of collaboration between school architect and educator as classrooms were either built on top of each other or side by side.

In 1916 John Dewey's book, Democracy and Education, was published. Dewey's Progressivism spread rapidly across the country and in many instances curriculum was revised to incorporate his ideas. He stressed the idea that education should be useful - therefore, it should be related to life. Learning experiences should be based upon things that are of interest to students and learning should involve the active participation of the student and a teacher-student planning element.

As a result of the acceptance of Dewey's ideas, a number of changes took place in school buildings. Learning experiences which were actively oriented required more space, therefore, by 1940 in general there were 80 to 100 square feet of space provided for each child while at the same time
class sizes were reduced to approximately 30 students. (EFL, 1960). In addition, furniture was no longer secured to the floor.

Atkinson and Malecka (1962) point out that after considerable trial and error in the design of school plants, architects and educators decided the greatest economy of space and material could be realized by designing schools in the shape of the letters B, H, I, L, T, and U. These architectural designs allowed for the addition of more classrooms when school population increased.

In general flexibility during this era of school design was limited to an occasional building which contained a few non-load-bearing walls and/or moveable seating. Removeable walls and folding partitions were also known. Between 1930 and 1940 an open-plan school was defined as one in which all rooms received direct, outside sunlight. A closed school meant a square or rectangular interior room which had to depend entirely on artificial lighting. (Wise, 1970)

Schoolhouses, 1945-1957

Immediately following World War II, there was a return of interest to education. Tremendous leaps in basic technology during the war and the unfolding of the Cold War provided concern for curricular changes in the sciences and mathematics. This emphasis on reform in the sciences and
mathematics programs continued, but few real changes were made until after Sputnik I was launched in 1957. The post war baby boom followed.

Schools during the 1940's and 1950's were usually designed using the finger plan - a single row of uniform classrooms usually with an exterior corridor. Glass was used extensively on exterior walls in order to allow the greatest amount of light into the classrooms. The interiors of these schools were usually of painted block or dry wall construction. Wood, resilient tile, or terrazzo was used on floors. Incandescent and later fluorescent lighting was used. Windows provided the only ventilation. Temperature control was difficult to say the least. Furniture was usually manufactured using wood. Chalkboards and tackboards were used on interior walls. Multiple use of space became an important element in determining the flexibility of a building.

According to McClurkin (1964) 1950 is considered when school architecture began to be based on the needs of the learner. Educators and architects began to work closely together and schools were designed to provide an atmosphere that would be stimulating to the learner.

Nonloadbearing walls, folding walls, and multi-purpose spaces became more prevalent during this period.

Early in the 1950's two variations of the finger plan became popular. The double-loaded corridor, a double row of
classrooms separated by a traffic corridor; and the back-to-back plan, similar to the finger plan except the classrooms are adjacent rows with an outside corridor. (Brunetti, 1971) Nevertheless, the finger plan remained the dominant basic school design.

Gradually, school planners realized that the basic designs and the variations were uneconomical to construct when the ratio of useable interior space to perimeter was considered. In addition, the many corridors and foyers which were needed in these basic designs proved wasteful of valuable space. Alternative school designs were sought.

Open-Space Schools

During the later part of the 1950's educators began to question the appropriateness of traditional school designs both in terms of their high construction costs per unit of useable space and in terms of their inability to house innovative educational programs which were growing increasingly oriented toward the needs of individual students.

The compact plan building requiring fewer windows was made possible through technical advances in the field of artificial lighting and air conditioning. Rooms no longer required an exterior wall in order to provide sunlight and ventilation. The compact building also means savings in construction costs.
The compact school is built from the inside to the outside with first consideration given to what is needed in the building. Compactness means no wasted interior space. For example, the compact concept reduces corridor space which in traditional schools often amounts to as much as 35 percent of the floor space. Compactness eliminates wasted exterior wall. Exterior wall is expensive and a reduction of perimeter saves more tax dollars for equipment inside the building. (Gilliland, 1967)

Wall-to-wall carpeting was introduced into classrooms. The ability to mechanically control temperature, sound, and lighting opened the way for a great deal more variation and experimentation in school design.

The first schoolhouse to draw national attention by rejecting interior walls was an elementary school in Carson City, Michigan. (EFL, Profiles, 1960) The school planners in Carson City designed an area equivalent in size to four conventional classrooms. The instructional program utilized team teaching and the open space allowed teachers to vary the size of their instructional groups with a minimum of effort.

Various operable walls and demountable partition designs appeared, although few school planners were ready to concede that interior walls were altogether unnecessary or even if it was possible to operate any kind of an instructional program under those conditions.

During 1960 school planners in Ridgewood, New Jersey,
developed the court corridor plan and created an open space 27 feet by 70 feet. The space was designed as the center area within a cluster of six conventional classrooms. The area was carpeted and windows were built into the walls of each classroom which faced the interior court corridor in order that teachers could superintend activities in the "open" area while remaining in their classrooms. (Smith, 1961)

Another school which received considerable early attention as an Open-Space facility was the Little Red Schoolhouse addition to the Lewis Sands School in Chagrin Falls, Ohio. (EFL, 1968)

As the rationale for Open-Space (increased opportunity for individualization, more efficient use of space, plant flexibility, and construction cost savings) became increasingly apparent and accepted, a number of existing schools were renovated to provide flexible open spaces. The Richmond Unified School District, Richmond, California (Brunetti and Deal, 1969) enclosed the exterior space between two wings of classrooms (finger plan) to provide an Open-Space room. Steel columns were used to replace interior load-bearing walls.

Open-Space school design became more accepted as educators realized the need for and potential of flexible spaces. Nongrading and continuous progress plans became increasingly popular as alternatives to the lock-step grading system which
had been used since the 1840's. Cooperative efforts by groups of teachers and even deliberately organized teams of teachers required instructional spaces for large groups of children as well as conventional size and smaller groups. Educators and school designers realized the profound effects of the learning environment upon the learner and embraced the mechanical and design environmental controls provided by recent technological advances. Real efforts were made to provide both a learning environment and instructional and grouping practices which took into account the individual differences and learning needs of students.

During 1962 a second generation of Open Schools appeared. These schools, more sophisticated and totally committed to Open-Space, included a number of architectural features not found in their predecessors. First, all second generation Open Schools were totally carpeted. Secondly, these schools contained larger and newer varieties of Open-Space. Thirdly, these schools contained separate special-purpose areas of various types and sizes. For instance, quiet places for individual students, messy activities, or noisy activities were provided. The Nelson S. Dilworth Elementary School in San Jose, California is given as the prototype which ushered in the era of the second generation Open School. This school contained one 3,840 square foot learning area, known as the "big room." This room contained an area
equivalent in size to four conventional classrooms. (EFL, 1968)

New shapes appeared. In 1965 the Valley Winds Elementary School in Riverview Gardens, Missouri was opened. This school was a "snailshaped" design and provided three concentric areas which spiraled out from a central core area. Few permanent interior walls were used making possible the organization of the school into learning suites of various sizes to accommodate the needs of the teams of teaching. The central core area was designed as a curriculum planning center for teachers, an electronic nerve center, and as an instructional material center for students. (Boggs, 1965)

The Granada Community School in Belvedere-Tiburon, California contains clusters of four hexagon-shaped classrooms fused into large open spaces. Demountable partitions are available but no permanent interior walls were used. (EFL, 1968) In 1966 the Edenvale Elementary School near San Jose, California was dedicated. This school consisted of three round Open-Space pods which contained an area equivalent to six conventional classrooms. These three round pods surrounded a fourth 5,000 square foot open area used as a library learning center. The Harry C. Fulton School, Fountain Valley, California was dedicated in 1968. This school uses a basic hexagon shape. The school consists of a central hexagon-shaped 10,000 square foot learning center. Surrounding the
1.32

Learning center unit are six hexagon-shaped modules, five of which contain four teaching stations each, the sixth is a multi-purpose room.

Warner (1970) points out in retrospect that many of the early Open-Space schools "hedged" by including structural features which would allow for creating conventional size rooms with partitions if future programs required this type of space. It may also be quite possible that these school designers lacked confidence in Open-Space.

The development of Open-Space continues to be gradual. Many variations and degrees of "openness" exist. There seems to be no dominant basic design, however, there is a recognizable general trend in school building design toward providing at least some open areas. Schools are still being constructed using the finger plan and the double loaded corridor plan, nevertheless the 1960's saw a significant increase in the number of new school buildings which utilized moveable operable walls. According to an article in the July, 1967 issue of School Management, a nationwide survey indicated that nearly half of the schools in the planning stage for construction in 1968 contained operable walls. Similarly, beginning in 1967 the dominant design feature of Nation's Schools "School-of-the-Month" and "Award-Winning-School" has been flexible open instructional areas.

John W. Gilliland, Director of the School Planning
Laboratory at the University of Tennessee, expressed the general impressions of school planners during the mid 1960's when he pointed out that the concept of one teacher and 30 students in a conventional classroom with permanent walls did not fit into the trend toward total flexibility. Permanent walls may in fact block the potential benefit to the learning which could be realized by team teaching, while abandonment of permanent interior walls provided almost any arrangement of space which would be required. (1967)

The Open-Space school is a response to changes in educational demands. Increased emphasis on and attention to individual differences and individual learning styles resulted in new consideration of how children best learn. New modes of learning and more personalized instructional techniques were developed from group-oriented instruction and lecture methods to more self-directed study and learning. Strict lock step grade organizations were being replaced by more humane nongraded continuous progress organizations. Technological advances not only provided means to control the thermal, visual, and acoustical aspects of the learning environment but also had an impact on instruction through the increased availability of electronic learning devices. Individual study carrels became increasingly popular devices for accommodating the individual learner. New staffing arrangements and new consideration as to how children should
be grouped for instruction also provided impetus for the movement toward more flexible school building design.

The January 1971 issue of *Nations Schools* compares six elementary and four middle schools which won 1970 AASA awards for design excellence. Of the six elementary schools, four utilize operable walls, one has demountable partitions, two are of basic Open design, while the remaining four provide open instructional areas through the use of the operable walls. Of the four middle schools, three utilize operable walls, one is of Open design, and two of the remaining three provide open areas through the use of the operable walls.

Open-Plan schools have and continue to have a significant impact on the very nature of the educational process in this country. According to Forrest E. Conner, Secretary Emeritus of the AASA, "The term classroom itself has become a kind of anachronism..." (AASA, 1971) In the same publication 29 Open-Plan elementary, middle, junior high, and senior high schools are illustrated. Considerable variation in basic shapes are apparent - from the octagonal cluster of Leo J. Muir Elementary School in Bountiful, Utah and the "snowflake" design of Wilde Lake Middle School in Columbia, Maryland to the basic rectangular modules of the Mt. Hope Elementary School in Rockaway, New Jersey. Nevertheless, the dominant theme is equally apparent in the extensive use
of expansive open areas (the degree of openness of these spaces varies), the minimal use of operable walls and/or demountable partitions and the central instructional material center/resource center/library area.

Brunetti, in status report on Open Space points out that, "Initially Open Space was a single modification of the self-contained classroom; most commonly from three to six classrooms were grouped into Open 'pods' or 'big rooms' to accommodate an equivalent number of class groups and teachers." (Brunetti, 1971) He continues (suggesting the possibility of a third generation of Open schools) that a modification of this theme is occurring. School planners are adding "commons" areas, "activities centers," and "resource centers" to the basic pods of classrooms. This brings instructional material closer to the students into satellite libraries, but it increases the overall size of the open area beyond the rated classroom area equivalency standards. In addition, the wider range of activities created by individual programs had created a need for closed spaces adjacent to the open areas.

Educators and school planners have recognized the potential effects of the parameters of the learning environment upon the learner and the rapidly increasing school construction costs and the rapid advances in school/learning technology have created a demand for school plants which
are flexible, convertible, adaptable, and expansible. Open-Plan schools have been the response to that demand. Total climate control capabilities have increased the flexibility of these new buildings and the exclusion of permanent interior walls allows for the accommodation of nearly all types of instructional programs.
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INDEX

Armington, David .... 2.1, 2.7
Barth, Roland S .... 2.19, 2.25, 2.28, 2.31, 2.33, 2.41, 2.43, 3.14, 5.1
Blackie, John .... 3.1, 3.6, 3.11
BRITISH INFANT, BRITISH PRIMARY....
0.1, 2.19, 2.23, 2.25, 2.27, 2.43, 3.1, 3.8, 3.9, 5.1

Historical Background .... 3.1, 3.2, 3.9
Infant School Buildings .... 3.2
Integrated Day .... 2.3, 2.28, 3.2, 3.9, 3.10
Leicestershire Model .... 2.28, 3.3, 3.10
Methods, Material, and Learning .... 3.3, 3.4, 3.5, 3.10
Plamen Report .... 2.39, 3.5, 3.11, 3.12
Related Literature .... 3.6, 3.12
Research .... 3.6, 3.13
Teachers .... 3.7, 3.13, 3.14

BRITISH JUNIOR AND SECONDARY SCHOOLS....
3.2, 3.3, 3.13

Bruner, Jerome .... 2.1
Brunetti, Frank .... 2.9, 2.19, 2.35
Clegg, Also (Sir) .... 2.25, 2.39, 3.3, 3.6
Critiques .... 2.13, 2.14, 2.15, 2.40
Dewey, John .... 2.2

Education Development Center, Inc. (EDC) .... 2.4, 5.1
Early Childhood Education Study .... 2.4, 2.7
Elementary Science Study (ESS) .... 2.4, 2.8

Educational Facilities Laboratories, Inc. (EFL) .... 2.10
Emerson, Ralph Waldo .... 2.2

Erickson, Eric .... 2.2
Featherstone, Joseph .... 2.2, 2.26, 2.39

FREE, NEW, RADICAL SCHOOLS .... 2.2, 2.27

Froebel, Friedrich .... 2.3, 3.2
Furniture for Open Schools .... 2.9, 2.26, 2.36
Gardner, Dorothy E. 2.4,2.15,3.6,3.11

General Learning Corporation 2.11

Hepworth, Marilyn 2.25,2.31

Hawkins, David 2.5,2.9,2.29,2.43

Holt, John 2.3,2.28,4.2,5.1

Hull, William P. 2.1,3.10

Humanistic Psychology 2.13,2.39

INTEGRATED DAY REFER TO BRITISH INFANT

Institute for Development of Educational Activities, Inc. 2.1,2.11,2.40

Isaacs, Susan 2.3,3.4,3.6

Kohl, Herbert 2.7,2.16,2.17,2.37

Kyrar, Barney 2.15,2.20,2.36

LEICESTERSHIRE MODEL REFER TO BRITISH INFANT

Montessori, Maria 2.6,2.27,2.30

Neill, A.S. 2.2,3.6

Nongraded Schools 2.6,2.21,2.22

OPEN EDUCATION 2.8,2.9,2.19,2.26,2.32,2.34,2.36,3.11

OPEN CLASSROOM 2.7,2.8,2.31,2.32,2.33,5.2

OPEN SCHOOL

OPEN-SPACE SCHOOLS

OPEN-SPACE SCHOOL DESIGN

Research 2.1,2.15,2.16,2.19,2.20,2.21,4.3

Students in Open Schools 4.1,4.3

Teachers in Open Schools 4.4

Piaget, Jean 2.12,2.13,2.39,2.5

FLOWREN REFER TO BRITISH INFANT

Progressive Education 2.15 SEE ALSO DEWEY

Rasmussen, Lore 2.6
Rathbone, Charles R.  
2.8, 2.21, 2.32, 2.34, 2.43, 3.11, 5.1  
RESEARCH...REFER TO BRITISH INFANT OR OPEN-SPACE SCHOOLS

Resnik, Henry S.  
2.32

Rogers, Vincent R.  
2.1, 2.26, 2.34, 2.40

Rousseau, Jean-Jacques  
2.6

Silberman, Charles E.  
2.15, 2.40

Spadock, Bernard  
2.8, 2.9, 2.27, 2.43

STUDENTS  
2.16, 2.40, 3.6, 3.13

TEACHERS, TEACHER TRAINING  
2.16, 2.17, 2.40, 2.41, 3.7, 3.13, 3.14, 4.4

Team Teaching  
2.18, 2.42

Weber, Lillian  
2.1

Williams, Rosemary  
2.6, 2.41

Yosemans, Edward  
2.9
Readers may want to use this space to keep notes during their research. The author will be extremely interested in comments from those who have made use of this compilation; these should be sent to: Frank H. Moyer, 737 Watchung Avenue, Plainfield, New Jersey, 07060.